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TITLE: MANUFACTURING METHOD OF FLAT WIRE HARNESS

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ABSTRACT:

PROBLEM TO BE SOLVED: To improve working efficiency.

SOLUTION: While a flat circuit body 15 is sandwiched between the upper and lower molds 11 and 12 through the medium of insulating sheets 13 and 14, the molds are heated and pressurized to weld the insulating sheets, thereby obtaining a flat wire harness. In this method, the insulating sheet on the undersurface is disposed on the upper surface of the lower mold in which a routing pin 17 is protrusively provided on the upper surface. A flat circuit body is routed on the insulating sheet using a routing pin. The insulating sheet on the top surface covers the flat circuit body to pressure-weld the upper mold onto the lower mold. In such a state, the molds are heated and pressurized, whereby the insulating sheets are welded to obtain the flat wire harness. By providing a projection 11a and a recess 12a on the joint surface of the mold, furthermore, the wire harness having three-dimensional directionality can be obtained.

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WEEK:

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TITLE: Flat wire harness manufacturing method involves
pressurizing and heating upper and lower dies for welding
insulating sheets provided covering the wire

PATENT-ASSIGNEE: YAZAKI CORP[YAZA]

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ABSTRACTED-PUB-NO: JP2002190221A

BASIC-ABSTRACT:

NOVELTY - An insulating sheet (14) is mounted on the upper face of the lower die (12), from which wiring pin (17) protrudes. Wire (15) is wired through the wiring pin. An insulating sheet (13) is mounted on the wire and an upper die (11) is made to contact the lower die. The insulating sheets are welded by pressurizing and heating.

USE - For manufacturing flat wire harness used in vehicles.

ADVANTAGE - Eliminates the trouble of the temporary fixation by the hot melt. Holds a wire in a fixed form with a wiring pin. Enables manufacturing a flat wire harness of three-dimensional shape. Improves the attachment property to a vehicle. Performs easy flat like wirings and enables manufacturing flat wire harness of extremely

thin form. Enables obtaining high quality high flat wire harness of an integrity without using an excessive process and an excessive number of components. Enables simple positioning of an insulating sheet.

DESCRIPTION OF DRAWING(S) - The figure shows a perspective view of lower die, sectional views of top die and flat wire harness. (Drawing includes non-English language text).

Upper die 11

Lower die 12

Insulating sheets 13,14

Wire 15

Wiring pin 17

CHOSEN- Dwg.1/2
DRAWING:

TITLE- FLAT WIRE HARNESS MANUFACTURE METHOD PRESSURISED HEAT
TERMS: UPPER LOWER DIE WELD INSULATE SHEET COVER WIRE

DERWENT-CLASS: X12

EPI-CODES: X12-D07;

SECONDARY-ACC-NO:

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Notes:

1. Untranslatable words are replaced with asterisks (****).
2. Texts in the figures are not translated and shown as it is.

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[Document Name] Description

[Title of the Invention] The manufacture method of flat wire harness

[Claim(s)]

[Claim 1] In the manufacture method of flat wire harness of putting an electric wire through an up-and-down insulation sheet between up-and-down metal patterns, making an insulation sheet welding by pressurizing and heating a metal pattern in the state, and obtaining flat-shaped wire harness Prepare the Shimokane type which protruded the **** jig of the electric wire on the upper surface, and a lower insulation sheet is put on the Shimokane type upper surface. Using said **** jig on it, put an upper insulation sheet for an electric wire on ***** and its electric wire, and an upper mold is made to weld by pressure to the Shimokane type. The manufacture method of the flat wire harness characterized by making an insulation sheet weld and obtaining flat-like wire harness by pressurizing and heating a metal pattern in the state.

[Claim 2] The manufacture method of the flat wire harness characterized by being pushed on an upper mold and making it a **** jig buried in the inside of the Shimokane type when it is the manufacture method of flat wire harness according to claim 1, said **** jig is prepared in the Shimokane type possible [****] and an upper mold is made to weld by pressure to the Shimokane type.

[Claim 3] The manufacture method of the flat wire harness characterized by obtaining the wire

harness which is the manufacture method of flat wire harness according to claim 1 or 2, prepared the concavo-convex part in the mating surface of said up-and-down metal pattern, and had three-dimensional directivity by the concavo-convex part.

[Claim 4] The manufacture method of the flat wire harness which is the manufacture method of flat wire harness according to claim 1 to 3, and is characterized by using a flat circuit object as said electric wire.

[Claim 5] The manufacture method of the flat wire harness which is the manufacture method of flat wire harness according to claim 4, and is characterized by welding simultaneously the insulator and said insulation sheet of said flat circuit object.

[Claim 6] The manufacture method of the flat wire harness which it is the manufacture method of flat wire harness according to claim 1 to 5, and said **** jig is a pin, and is characterized by the ability of the hole which this pin inserts in an up-and-down insulation sheet having opened.

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the manufacture method of flat wire harness of obtaining flat-shaped wire harness, by carrying out a hot press on both sides of an electric wire between the insulation sheets of two sheets.

[0002]

[Description of the Prior Art] Drawing 2 (a) and (b) are the explanatory views of the manufacture method of conventional flat wire harness given in JP,H2-278615,A. [the manufacture method of this flat wire harness] By carrying out temporary immobilization of two

or more electric wires 5 in which plastic deformation is possible by the ***** hot melt 6 at the shape of a flat, putting it through the insulation sheets 3 and 4 between the up-and-down metal patterns 1 and 2, and pressurizing and heating metal patterns 1 and 2 in the state (hot press) The insulation sheets 3 and 4 are made to weld and predetermined-shaped flat wire harness 7 is obtained.

[0003]

[Problem to be solved by the invention] After performing **** of the electric wire 5 beforehand at places other than a metal pattern 1 and 2 and carrying out temporary immobilization of it by hot melt 6 by the above-mentioned conventional method, since he was trying to set between the up-and-down metal patterns 1 and 2, only the part in which the temporary fixed process by hot melt 6 exists had bad working capacity.

[0004] This invention aims at offering the manufacture method of flat wire harness of having enabled it to aim at improvement in working capacity, in consideration of the above-mentioned situation.

[0005]

[Means for solving problem] Invention of Claim 1 puts an electric wire through an up-and-down insulation sheet between up-and-down metal patterns. In the manufacture method of flat wire harness of making an insulation sheet welding and obtaining flat-shaped wire harness by pressurizing and heating a metal pattern in the state Prepare the Shimokane type which protruded the **** jig of the electric wire on the upper surface, and a lower insulation sheet is put on the Shimokane type upper surface. It is characterized by putting an upper insulation sheet for an electric wire on ***** and its electric wire, making an upper mold weld by pressure to the Shimokane type, using said **** jig on it, making an insulation sheet weld by pressurizing and heating a metal pattern in the state, and obtaining flat-like wire harness.

[0006] By this manufacture method, since **** of a direct electric wire is performed on a metal

pattern, the rise of working capacity can be aimed at. That is, in the former, after performing **** of the electric wire at places other than a metal pattern and carrying out temporary immobilization of it by hot melt, it had set on the metal pattern, but since the process which carries out temporary immobilization by the hot melt can be skipped, the rise of the working capacity of the part can be aimed at.

[0007] Invention of Claim 2 is the manufacture method of flat wire harness according to claim 1, and when said **** jig is prepared in the Shimokane type possible [****] and an upper mold is made to weld by pressure to the Shimokane type, it is characterized by being pushed on an upper mold and making it a **** jig buried in the inside of the Shimokane type.

[0008] By this manufacture method, since it is pushed on an upper mold and he is trying to bury a **** jig in the inside of the Shimokane type automatically if an upper mold is carried on the Shimokane type, a **** jig does not become the obstacle of a hot press.

[0009] Invention of Claim 3 is the manufacture method of flat wire harness according to claim 1 or 2, prepares a concavo-convex part in the mating surface of said up-and-down metal pattern, and is characterized by obtaining the wire harness which had three-dimensional directivity by the concavo-convex part.

[0010] Three-dimensions-shaped wire harness can be obtained by this manufacture method.

[0011] Invention of Claim 4 is the manufacture method of flat wire harness according to claim 1 to 3, and is characterized by using a flat circuit object as said electric wire.

[0012] By this manufacture method, flat-like **** can make a flat circuit object easy by that of ***** on the Shimokane type.

[0013] Invention of Claim 5 is the manufacture method of flat wire harness according to claim 4, and is characterized by welding simultaneously the insulator and said insulation sheet of

said flat circuit object.

[0014] By this manufacture method, since these insulation sheets and the insulator of a flat circuit object are made to weld at the same time it makes a metal pattern heat and makes insulation sheets weld, unification of a flat circuit object and an insulation sheet can be attained, without using adhesives.

[0015] Invention of Claim 6 is the manufacture method of flat wire harness according to claim 1 to 5, and said **** jig is a pin and it is characterized by the ability of the hole which this pin inserts in an up-and-down insulation sheet having opened.

[0016] By this manufacture method, since the hole which the pin as a **** jig inserts in was formed in the insulation sheet, positioning of an insulation sheet can be performed simply and certainly.

[0017]

[Mode for carrying out the invention] The embodiment of this invention is hereafter explained based on Drawings.

[0018] As shown in drawing 1 (a) and (b), by the manufacture method of this flat wire harness, Shimokane type 12 which protruded the **** pin (**** jig) 17 on the upper surface is used. Two or more **** pins 17 are arranged in the predetermined part so that the cable wiring path of an electric wire may be shown. And when it is prepared in Shimokane type 12 possible [****] and an upper mold 11 is made to weld by pressure to Shimokane type 12, each **** pin 17 is pushed on an upper mold 11, and it is prepared so that it may be buried in the inside of Shimokane type 12. For example, it is energized in the projection direction with the spring.

[0019] In manufacturing flat wire harness, the lower insulation sheet 14 is carried on Shimokane type 12 constituted in this way first. The hole 14a which the **** pin 17 inserts in

the insulation sheet 14 beforehand has opened, and the insulation sheet 14 can be correctly arranged in a predetermined position by inserting each hole 14a in the **** pin 17.

[0020] Subsequently, it is ***** about the flat circuit object 15, using the **** pin 17 on the insulation sheet 14. In this case, temporary fastener means, such as hot melt, are unnecessary in the direct flat circuit object 15 at that of *****, and there is Merritt which can skip the temporary fixed process by hot melt on Shimokane type 12.

[0021] the flat circuit object 15 -- **** -- the upper insulation sheet 13 is put the bottoms and on it. It is good to open the hole which the **** pin 17 inserts also in this insulation sheet 13.

[0022] And where the flat circuit object 15 is inserted with the up-and-down insulation sheets 13 and 14, by carrying out downward moving of the upper mold 11, making it weld by pressure to Shimokane type 12, and pressurizing and heating metal patterns 11 and 12 in the state, the insulation sheets 13 and 14 are made to weld and flat wire harness 10 is obtained. In addition, the concavo-convex parts 11a and 12a are formed in the mating surface of the up-and-down metal patterns 11 and 12 in this case, and the flat wire harness 10 which had three-dimensional directivity by those concavo-convex parts 11a and 12a is obtained. Therefore, the attachment nature to the body can be raised.

[0023] Moreover, since the **** pin 17 will be pushed on an upper mold 12 and will be automatically buried in the inside of Shimokane type 12 if an upper mold 11 is welded by pressure on Shimokane type 12, it does not become the obstacle at the time of carrying out a hot press. And since the flat circuit object 15 can be held in a fixed form till the moment of a hot press, there is also no possibility of 15 flat circuit object of carrying out a position gap.

[0024] Moreover, in this embodiment, since the flat circuit object 15 is used as an electric wire, flat-like **** is made easily and the flat wire harness 10 of a very thin form can be manufactured.

[0025] Moreover, when it leaves the hole 14a prepared in the insulation sheets 13 and 14 to

the flat wire harness 10 of a product stage, the hole 14a can also be used for attachment immobilization of wire harness, and it is also possible to increase the convenience at the time of attachment.

[0026] In addition, as a flat circuit object 15, FFC (flexible flat cable), FPC (flexible print circuit), a flat electric wire (ribbon electric wire), etc. can be used, for example. Moreover, as a material of the insulation sheets 13 and 14, thermoplastics, such as polyethylene (PE), polypropylene (PP), and polyethylene terephthalate (PET), can be used.

[0027] When [moreover,] the insulator of the flat circuit object 15 consists of thermoplastics Make it weld simultaneously, can also really carry out the insulator and the insulation sheets 13 and 14 of a flat circuit object at the time of pressurization and heating of metal patterns 11 and 12, and [in such a case] Firm unification of the flat circuit object 15 and the insulation sheets 13 and 14 can be attained without using adhesives, and the quality high flat wire harness of an integrity can be obtained, without using an excessive process (like adhesives coater) and an excessive member (adhesives).

[0028]

[Effect of the Invention] Since **** of a direct electric wire is performed on a metal pattern according to invention of Claim 1 as explained above, the trouble of the temporary immobilization by the conventional hot melt is lost, and the rise of working capacity can be aimed at.

[0029] Since according to invention of Claim 2 it is automatically buried so that a **** jig may not become the obstacle of a press, an electric wire can be held in a fixed form by a **** jig till the moment of a hot press.

[0030] Since three-dimensions-shaped flat wire harness can be manufactured according to invention of Claim 3, the attachment nature to the body can be raised.

[0031] Since a flat circuit object is used as an electric wire according to invention of Claim 4, flat-like **** is made easily and the flat wire harness of a very thin form can be manufactured.

[0032] Since unification of a flat circuit object and an insulation sheet can be attained according to invention of Claim 5, without using adhesives, the quality high flat wire harness of an integrity can be obtained without using an excessive process (like adhesives coater) and an excessive member (adhesives).

[0033] Since the hole which the pin as a **** jig inserts in an insulation sheet was formed according to invention of Claim 6, it comes to be able to perform positioning of an insulation sheet simply and certainly. Moreover, the hole can also be used for attachment immobilization of wire harness in a product stage.

[Brief Description of the Drawings]

[Drawing 1] with the explanatory view of the embodiment of this invention, (a) passes an insulation sheet on the Shimokane type -- a flat circuit object -- **** -- the perspective view the bottom showing a state, the sectional view showing the state where (b) is going to weld the up-and-down metal pattern by pressure, and (c) are the sectional views of the product after a press.

[Drawing 2] With the explanatory view of the conventional manufacture method, (a) is the perspective view showing the combination relation before carrying out a hot press, and a perspective view in which (b) shows the product after a hot press.

[Explanations of letters or numerals] 10 Flat Wire Harness 11 Upper Mold 11a Concavo-convex Part 12 Shimokane Type 12a Concavo-convex Parts 13 and 14 Insulation Sheet 14a Hole 15 Flat Circuit Object (Electric Wire) 17 **** Pin (**** Jig)

[Translation done.]

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MANUFACTURING METHOD OF FLAT WIRE HARNESS
[Furatto waiya ha-nesu no seizohoho]

Masayuki Kondo

UNITED STATES PATENT AND TRADEMARK OFFICE
Washington, D.C. November 2007

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[Claim(s)]

*

[Claim 1] Manufacturing method of flat wire harness which sandwiches an electric wire between the upper and lower molds through insulating sheets and

then heats and pressurizes the mold in this condition for welding the insulating sheets, comprising

a step of preparing a lower mold having a projecting routing jig for electric wire on the upper surface,

a step of positioning the lower side insulating sheet on the upper surface of said lower mold,

a step of disposing the electric wire on the insulating sheet surface by utilizing the routing jig,

a step of covering the upper side insulating sheet over the electric wire thereof, letting the upper mold contact the lower mold with pressure,

a step of welding the insulating sheets by pressurizing and heating the molds in the state thereof for producing a flat wire harness.

[Claim 2] Manufacturing method of flat wire harness according to Claim 1, wherein

said routing jig is provided to the lower mold in a manner to allow its protrusive and sinking movements, so that it can be buried

* Paragraph numbers correspond to the numbers in the foreign text.

inside the lower mold with the pressure of upper mold when the upper mold is press-contacted to the lower mold.

[Claim 3] Manufacturing method of flat wire harness according to Claim 1 or 2, wherein

projection/recess sections are formed to the joining faces of said upper and lower molds so that a flat wire harness having three-dimensional directionality can be formed with said projection-recess parts.

[Claim 4] Manufacturing method of flat wire harness according to Claims 1 - 3, wherein

a flat circuit body is used as said electric wire.

[Claim 5] Manufacturing method of flat wire harness according to Claim 4, wherein

the insulating body of said flat circuit body and said insulating sheets are simultaneously welded.

[Claim 6] Manufacturing method of flat wire harness according to Claims 1 - 5, wherein

said routing jig is a pin, and a hole through which said pin can be pushed in is formed to the upper and lower insulating sheets.

[Detailed Explanation of this Invention]

[0001] [Field of the Invention]

This invention relates to the manufacturing method of flat wire harness, which sandwiches electric wires between two insulating sheets and hot-presses the sheets to obtain a flat wire harness.

[0002] [Description of the Prior Art]

Parts (a) and (b) in Fig. 2 are the explanatory views of the conventional manufacturing method of flat wire harness disclosed in JP-A (Tokkai) H2-278615. According to this flat wire harness production method, a plurality of electric wires 5 which can be deformed plastically are disposed flatly, temporarily immobilized by hot-melt 6, and sandwiched between upper and lower molds 1, 2 through insulation sheets 3 and 4; then, a specifically shaped flat wire harness 7 is obtained by pressurizing and heating (hot-press) the molds 1, 2 in this state to weld the insulating sheets 3, 4.

[0003] [Problem(s) to be Solved by the Invention]

With the abovementioned conventional method, after electric wires 5 are first disposed beforehand in locations other than the molds 1 and 2 and temporarily fixed by hot-melt 6, these wires 5 in this state are set between the upper and lower molds 1, 2. Therefore, work efficiency is low for the process of temporary fixing process by hot-melt 6.

[0004] By considering the abovementioned situation, this invention aims at offering the manufacturing method of flat wire harness with improved work efficiency.

[0005] [Means for Solving the Problem]

As the characteristic of this invention in Claim 1, this invention provides a manufacturing method of flat wire harness by sandwiching an electric wire between the upper and lower molds

through insulating sheets and heating and pressurizing the mold in this condition for welding the insulating sheets, comprising a step of preparing a lower mold having a projecting wire-disposing tool for electric wire on the upper surface, a step of positioning the lower side insulating sheet on the upper surface of said lower mold, a step of disposing the electric wire on the insulating sheet surface by utilizing the wire-disposing tool, a step of covering the upper side insulating sheet over the electric wire thereof and making the upper mold contact the lower mold with pressure, a step of welding the insulating sheets by pressurizing and heating the molds in the state thereof for producing flat wire harness.

[0006] Based on this manufacturing method, since electric wires are disposed directly on the molds, the work efficiency can be improved. That is, the conventional method disposes electric wires at the location other than the metal molds, temporarily fixes those wires with hot-melt, and sets them on the metal molds. However, since the method based on this invention can eliminate the process of temporarily fixing the wires with hot-melt, the work efficiency can be improved for the amount of eliminated process.

[0007] As the characteristic of this invention in Claim 2, according to the manufacturing method of flat wire harness described in Claim 1, said routing jig is provided to the lower mold in a manner to allow its protrusive and sinking movements so that it can

be buried inside of the lower mold with the pressure of upper mold when the upper mold is press-contacted to the lower mold.

[0008] Based on this manufacturing method, when the upper mold is placed on the lower mold, the routing jig is pushed by the upper mold and automatically buried in the lower mold. Therefore, the routing jig does not become an obstacle to hot-pressing.

[0009] As the characteristic of this invention in Claim 3, according to the manufacturing method of flat wire harness described in Claim 1 or 2, projection/recess sections are formed to the joining faces of said upper and lower molds so that a flat wire harness with three-dimensional directionality can be provided with said projection-recess parts.

[0010] With this manufacturing method, a flat wire harness with three-dimensional directionality can be provided.

[0011] As the characteristic of this invention in Claim 4, according to the manufacturing method of flat wire harness described in Claims 1 - 3, a flat circuit body is used as said electric wire.

[0012] With this manufacturing method, since a flat circuit body is disposed on the lower mold, flat disposition can be easily provided.

[0013] As the characteristic of this invention in Claim 5, according to the manufacturing method of flat wire harness described in Claim 4, the insulating body of said flat circuit body and said insulating sheets are simultaneously welded.

[0014] With this manufacturing method, since molds are heated to provide mutual welding of the insulating sheets simultaneous to the process of welding these insulating sheets and insulating body of the flat circuit, the flat circuit and insulating sheets can be integrated without using adhesives.

[0015] As the characteristic of this invention in Claim 6, according to the manufacturing method of flat wire harness described in Claims 1 - 5, said routing tool is a pin, and a hole in which said pin is pushed through is formed to the upper and lower insulating sheets.

[0016] With this manufacturing method, since a hole through which a pin used as a routing jig pushed in is formed to the insulating sheets, the insulating sheets can be positioned easily and certainly.

[0017] [Embodiment of the Invention]

Hereafter, the embodiment of this invention is explained based on the figures.

[0018] As shown in Part (a) and (b) of Fig. 1, this flat wire harness manufacturing method uses a lower mold 12 having a routing pin (routing jig) 17 on the upper surface. This routing pin 17 is positioned at plural specific locations for guiding the routes of the electric wires. Furthermore, each routing pin 17 is formed to the lower mold 12 in such a way that it can project and sink from the surface. Thereby, when the upper mold 11 is press-contacted to the

lower mold 12, the pin 17 can be pushed by the upper mold 11 and buried inside of the lower mold 12. For example, the pin is energized in the projecting direction by a spring.

[0019] In manufacturing a flat wire harness, the lower insulation sheet 14 is placed on the lower mold 12 configured as described above. Holes 14a through which routing pins 17 are pushed in are provided to the insulating sheet 14 beforehand. Thereby, by fitting each hole 14a to a routing pin 17, the insulating sheet 13 can be accurately positioned at a prescribed position.

[0020] Subsequently, the flat circuit body 15 is disposed on the insulating sheet 14 by utilizing the routing pin 17. In this case, since the flat circuit body 15 is directly disposed on the lower mold 12, a temporary fixing means, such as hot-melt, is unnecessary, subsequently providing an advantage of eliminating the temporary fixing process using hot-melt.

[0021] After the flat circuit body 15 is disposed, the upper insulation sheet 13 is placed over the flat circuit body 15. Holes for inserting the routing pins 17 should be formed to this insulating sheet 13 as well.

[0022] Then, in the state of sandwiching the flat circuit body 15 between the upper and lower insulating sheets 13 and 14, the upper mold 11 is moved downwardly to press-contact to the lower mold. By pressurizing and heating the molds 11, 12 in this condition, insulating sheets 13, 14 are welded to provide a flat wire harness

10. Note that, in this case, since projection and recess sections 11a, 12a are formed at the joining faces of the upper and lower molds 11, 12, a flat wire harness 10 having three-dimensional directionality can be obtained by these projection and recess parts 11a, 12. Therefore, the property of the wire harness for assembling to a car body can be improved.

[0023] Moreover, since the routing pin 17 is arranged such a way that, when the upper mold 11 is press-contacted to the lower mold 12, the routing pin 17 can be automatically buried inside of the lower mold 12. Therefore, the routing pin 17 does not become an obstacle to hot-pressing. Moreover, since the flat circuit body 15 can be held in the fixed form to the moment of hot-press, there is also no possibility of shifting of the flat circuit body 15.

[0024] Moreover, since a flat circuit body 15 is used as an electric wire in this embodiment, wires can be easily flatly disposed, thereby allowing the production of extremely thin form flat wire harness 10.

[0025] Furthermore, when the holes 14a provided to the insulating sheets 13 and 14 are left to the flat wire harness 10 of product phase, those holes 14a can also be used for mounting and fixing the wire harness, thereby providing increased convenience at the time of installation.

[0026] In addition, as a flat circuit body 15, an FFC (flexible flat cable), an FPC (flexible print circuit), a flat electric wire

(ribbon wire), etc. can be used, for example. Moreover, as the material of insulation sheets 13 and 14, thermoplastics, such as polyethylene (PE), polypropylene (PP), and polyethylene terephthalate (PET), can be used.

[0027] Moreover, when the insulator of the flat circuit body 15 consists of a thermoplastic resin, the insulator of the flat circuit body and the insulating sheets 13 and 14 can be simultaneously welded at the time of pressurizing and heating the molds 11, 12 to form an integral unit. In this case, strong unification of the flat circuit body 15 and insulating sheets 13 and 14 can be attained without using adhesives. Hence, a flat wire harness of high integrity and high quality can be obtained without using an excessive process (adhesives spreading process) or an excessive member (adhesives).

[0028] [Effect of the Invention]

As described above, according to the first claim of this invention, since electric wires are directly routed on the mold, the conventionally experienced problem in temporarily fixing the wires by hot-melt can be eliminated to provide improved work efficiency.

[0029] According to the second claim of this invention, since the routing jig is automatically buried so as to prevent the jig from becoming an obstacle of the hot-pressing process, electric wires can be held in the fixed form with a routing jig until the moment of hot-press.

[0030] According to Claim 3 of this invention, since a three-dimensionally configured flat wire harness can be produced, the property of the wire harness can be improved for assembling to a car body.

[0031] According to Claim 4 of this invention, since a flat circuit body is used as an electric wire, flatly arranged wire routing can be easily provided. Thereby, an extremely thinly formed flat wire harness can be produced.

[0032] According to Claim 5 of this invention, since a flat circuit body and an insulation sheet can be integrated without using adhesives, a high integrity and high quality flat wire harness can be obtained without using an excessive process (adhesives spreading process) or an excessive member (adhesives).

[0033] According to Claim 6 of this invention, by forming holes through which pins used as routing jigs can be pushed in, positioning of the insulating sheets can be accomplished easily and assuredly. Furthermore, those holes can be utilized for mounting and fixing the wire harness of product phase.

[Brief Description of the Drawings]

[Fig. 1] Explanatory view of the embodiment of this invention, where Part (a) is the perspective view showing the condition in which the flat circuit body is disposed on upper and lower molds through insulation sheets, Part (b) is the cross-sectional view showing the condition in which the upper and lower molds are about to be press-

contacted, and Part (c) is the cross-sectional view showing the product after pressing.

[Fig. 2] Explanatory view of the conventional manufacturing method, where Part (a) is the perspective view showing the assembly relation prior to hot-press, and Part (b) is the perspective view showing the product after hot-press.

[Description of Notations]

10...Flat wire harness; 11...Upper mold; 11a...Projecting-recessing part; 12...Lower mold; 12a...Projecting-recessing part; 13, 14...Insulating sheet; 14a...Hole; 15...Flat circuit body (electric wire); 17...Routing pin (routing jig)

Figure 1

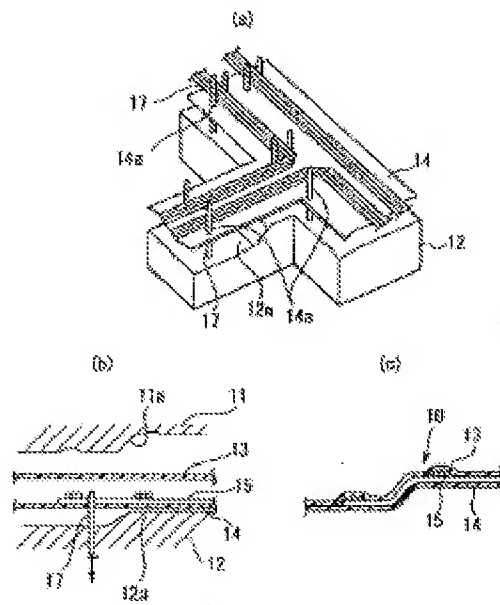
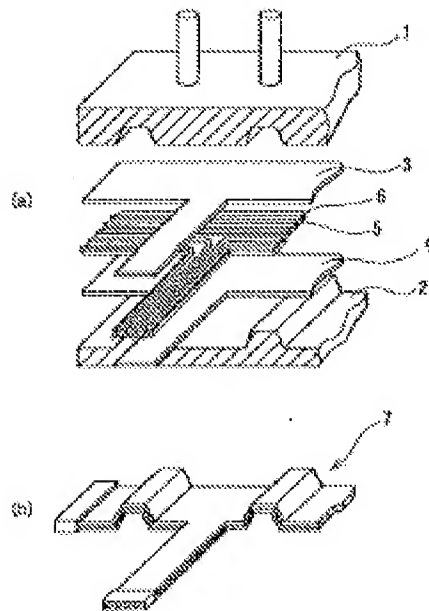


Figure 2



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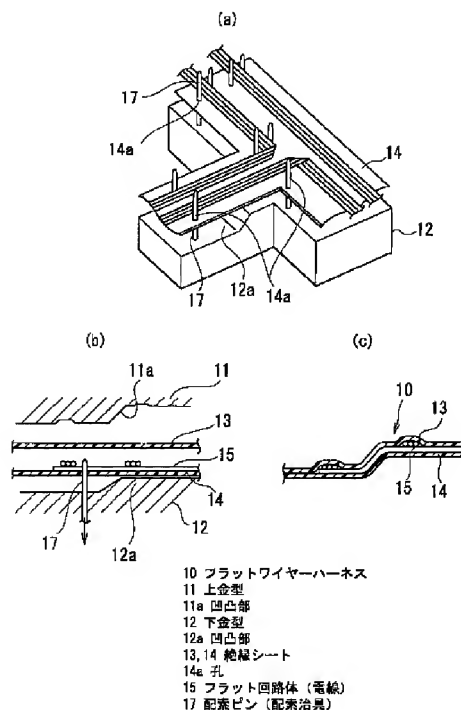
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(54)【発明の名称】 フラットワイヤーハーネスの製造方法

(57)【要約】

【課題】 作業能率の向上を図る。

【解決手段】 上下金型11、12間に上下の絶縁シート13、14を介してフラット回路体15を挟み込み、その状態で金型を加圧・加熱することにより絶縁シートを溶着させてフラット形状のワイヤーハーネスを得る方法において、上面に配索ピン17を突設した下金型の上面に下側の絶縁シートを載せ、その上に配索ピンを利用しながらフラット回路体を配索し、その上に上側の絶縁シートを被せて上金型を下金型に圧接させ、その状態で金型を加圧・加熱することにより絶縁シートを溶着させてフラットワイヤーハーネス10を得る。しかも、上下金型の合わせ面に凹凸部11a、12aを設けることで、3次元的な方向性を持ったワイヤーハーネス10を得る。



【特許請求の範囲】

【請求項1】 上下金型間に上下の絶縁シートを介して電線を挟み込み、その状態で金型を加圧・加熱することにより絶縁シートを溶着させてフラット形状のワイヤーハーネスを得るフラットワイヤーハーネスの製造方法において、

上面に電線の配索治具を突設した下金型を用意し、その下金型の上面に下側の絶縁シートを載せ、その上に前記配索治具を利用しながら電線を配索し、その電線の上に上側の絶縁シートを被せて上金型を下金型に圧接させ、その状態で金型を加圧・加熱することにより絶縁シートを溶着させてフラット状のワイヤーハーネスを得ることを特徴とするフラットワイヤーハーネスの製造方法。

【請求項2】 請求項1記載のフラットワイヤーハーネスの製造方法であって、

前記配索治具を下金型に突没可能に設け、上金型を下金型に圧接させたときに、上金型に押されて配索治具が下金型の内部に埋没するようにしたことを特徴とするフラットワイヤーハーネスの製造方法。

【請求項3】 請求項1または2記載のフラットワイヤーハーネスの製造方法であって、

前記上下金型の合わせ面に凹凸部を設け、その凹凸部により3次元的な方向性を持ったワイヤーハーネスを得ることを特徴とするフラットワイヤーハーネスの製造方法。

【請求項4】 請求項1～3のいずれかに記載のフラットワイヤーハーネスの製造方法であって、

前記電線としてフラット回路体を用いることを特徴とするフラットワイヤーハーネスの製造方法。

【請求項5】 請求項4記載のフラットワイヤーハーネスの製造方法であって、

前記フラット回路体の絶縁体と前記絶縁シートとを同時に溶着することを特徴とするフラットワイヤーハーネスの製造方法。

【請求項6】 請求項1～5のいずれかに記載のフラットワイヤーハーネスの製造方法であって、

前記配索治具がピンであり、上下の絶縁シートに該ピンの挿通する孔が開けられていることを特徴とするフラットワイヤーハーネスの製造方法。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、2枚の絶縁シート間に電線を挟んでホットプレスすることにより、フラット形状のワイヤーハーネスを得るフラットワイヤーハーネスの製造方法に関する。

【0002】

【従来の技術】図2(a)、(b)は特開平2-278615号公報に記載の従来のフラットワイヤーハーネスの製造方法の説明図である。このフラットワイヤーハーネスの製造方法は、塑性変形可能な複数の電線5をフラ

ット状に配索してホットメルト6で仮固定し、それを上下金型1、2間に絶縁シート3、4を介して挟み込み、その状態で金型1、2を加圧・加熱(ホットプレス)することにより、絶縁シート3、4を融着させて、所定形状のフラットワイヤーハーネス7を得るというものである。

【0003】

【発明が解決しようとする課題】上記従来の方法では、金型1、2以外の場所で予め電線5の配索を行い、それをホットメルト6で仮固定した上で、上下金型1、2間にセットするようにしていたので、ホットメルト6による仮固定工程が存在する分だけ、作業能率が悪かった。

【0004】本発明は、上記事情を考慮し、作業能率の向上を図れるようにしたフラットワイヤーハーネスの製造方法を提供することを目的とする。

【0005】

【課題を解決するための手段】請求項1の発明は、上下金型間に上下の絶縁シートを介して電線を挟み込み、その状態で金型を加圧・加熱することにより絶縁シートを溶着させてフラット形状のワイヤーハーネスを得るフラットワイヤーハーネスの製造方法において、上面に電線の配索治具を突設した下金型を用意し、その下金型の上面に下側の絶縁シートを載せ、その上に前記配索治具を利用しながら電線を配索し、その電線の上に上側の絶縁シートを被せて上金型を下金型に圧接させ、その状態で金型を加圧・加熱することにより絶縁シートを溶着させてフラット状のワイヤーハーネスを得ることを特徴とする。

【0006】この製造方法では、金型上で直接電線の配索を行うので、作業能率のアップが図れる。即ち、従来では、金型以外の場所で電線の配索を行い、それをホットメルトで仮固定した上で、金型上にセットしていたが、そのホットメルトで仮固定する工程が省けるので、その分の作業能率のアップが図れる。

【0007】請求項2の発明は、請求項1記載のフラットワイヤーハーネスの製造方法であって、前記配索治具を下金型に突没可能に設け、上金型を下金型に圧接させたときに、上金型に押されて配索治具が下金型の内部に埋没するようにしたことを特徴とする。

【0008】この製造方法では、下金型の上面に上金型を載せると、上金型に押されて自動的に配索治具が下金型の内部に埋没するようにしているので、配索治具がホットプレスの邪魔にならない。

【0009】請求項3の発明は、請求項1または2記載のフラットワイヤーハーネスの製造方法であって、前記上下金型の合わせ面に凹凸部を設け、その凹凸部により3次元的な方向性を持ったワイヤーハーネスを得ることを特徴とする。

【0010】この製造方法では、3次元形状のワイヤーハーネスを得ることができる。

【0011】請求項4の発明は、請求項1～3のいずれかに記載のフラットワイヤーハーネスの製造方法であって、前記電線としてフラット回路体を用いることを特徴とする。

【0012】この製造方法では、下金型の上にフラット回路体を配索するので、フラット状の配索が容易にできる。

【0013】請求項5の発明は、請求項4記載のフラットワイヤーハーネスの製造方法であって、前記フラット回路体の絶縁体と前記絶縁シートとを同時に溶着すること

を特徴とする。

【0014】この製造方法では、金型を加熱させて絶縁シート同士を溶着させると同時に、それら絶縁シートとフラット回路体の絶縁体とを溶着させるので、接着剤を使わずにフラット回路体と絶縁シートの一体化が図れる。

【0015】請求項6の発明は、請求項1～5のいずれかに記載のフラットワイヤーハーネスの製造方法であって、前記配索治具がピンであり、上下の絶縁シートに該ピンの挿通する孔が開けられていることを特徴とする。

【0016】この製造方法では、配索治具としてのピンの挿通する孔を絶縁シートに形成したので、絶縁シートの位置決めが簡単・確実にできる。

【0017】

【発明の実施の形態】以下、本発明の実施形態を図面に基いて説明する。

【0018】図1(a)、(b)に示すように、このフラットワイヤーハーネスの製造方法では、上面に配索ピン(配索治具)17を突設した下金型12を使用する。配索ピン17は、電線の配索経路を案内するように所定箇所

に複数配置されている。しかも、各配索ピン17は下金型12に突没可能に設けられており、上金型11を下金型12に圧接させたときに、上金型11に押されて、下金型12の内部に埋没するように設けられている。例えば、バネによって突出方向に付勢されている。

【0019】フラットワイヤーハーネスを製造するに当たって、まず、このように構成された下金型12の上に下側の絶縁シート14を載せる。絶縁シート14には、予め配索ピン17の挿通する孔14aが開けられており、各孔14aを配索ピン17に嵌めることで、絶縁シート14を所定位置に正確に配置することができる。

【0020】次いで、その絶縁シート14の上に、配索ピン17を利用しながら、フラット回路体15を配索する。この場合、下金型12の上で直接フラット回路体15を配索するので、ホットメルト等の仮固定手段が不要であり、ホットメルトによる仮固定工程を省略できるメリットがある。

【0021】フラット回路体15を配索したら、その上に上側の絶縁シート13を被せる。この絶縁シート13にも配索ピン17の挿通する孔を開けておくのがよい。

【0022】そして、上下の絶縁シート13、14でフラット回路体15を挟んだ状態で、上金型11を下動させて下金型12に圧接させ、その状態で、金型11、12を加圧・加熱することにより、絶縁シート13、14を溶着させて、フラットワイヤーハーネス10を得る。なお、この場合、上下金型11、12の合わせ面には凹凸部11a、12aが設けられており、その凹凸部11a、12aにより、3次元的な方向性を持ったフラットワイヤーハーネス10が得られる。従って、車体への組み付け性を向上させることができる。

【0023】また、配索ピン17は、下金型12の上に上金型11を圧接すると、上金型12に押されて自動的に下金型12の内部に埋没するようになっているので、ホットプレスする際の邪魔にはならない。しかも、ホットプレスの瞬間までフラット回路体15を一定の形態に保持しておくことができるので、フラット回路体15が位置ずれするおそれもない。

【0024】また、この実施形態では、電線としてフラット回路体15を用いているので、フラット状の配索が容易にでき、極めて薄い形態のフラットワイヤーハーネス10を製造することができる。

【0025】また、製品段階のフラットワイヤーハーネス10に絶縁シート13、14に設けた孔14aを残した場合には、その孔14aをワイヤーハーネスの取り付け固定用に利用することもでき、取り付け時の利便性を高めることも可能である。

【0026】なお、フラット回路体15としては、例えば、FFC(フレキシブルフラットケーブル)、FPC(フレキシブルプリントサーキット)、フラット電線(リボン電線)などを使用することができる。また、絶縁シート13、14の材料としては、ポリエチレン(PE)、ポリプロピレン(PP)、ポリエチレンテレフタレート(PET)等の熱可塑性樹脂を使用することができる。

【0027】また、フラット回路体15の絶縁体が熱可塑性樹脂で構成されている場合は、金型11、12の加圧・加熱時にフラット回路体の絶縁体と絶縁シート13、14とを同時に溶着させて一体することもでき、そうした場合は、接着剤を使わずにフラット回路体15と絶縁シート13、14の強固な一体化が図れ、余計な工程(接着剤塗布工程)や部材(接着剤)を使用せずに、一体性の高い高品質のフラットワイヤーハーネスを得ることができる。

【0028】

【発明の効果】以上説明したように、請求項1の発明によれば、金型上で直接電線の配索を行うので、従来のホットメルトによる仮固定の面倒がなくなり、作業能率のアップが図れる。

【0029】請求項2の発明によれば、配索治具がプレス

トプレス瞬間まで電線を配索治具で一定の形態に保持しておくことができる。

【0030】請求項3の発明によれば、3次元形状のフラットワイヤーハーネスを製造することができるので、車体への組み付け性を向上させることができる。

【0031】請求項4の発明によれば、電線としてフラット回路体を用いるので、フラット状の配索が容易にでき、極めて薄い形態のフラットワイヤーハーネスを製造することができる。

【0032】請求項5の発明によれば、接着剤を使わず 10 にフラット回路体と絶縁シートの一体化が図れるので、余計な工程（接着剤塗布工程）や部材（接着剤）を使用せずに、一体性の高い高品質のフラットワイヤーハーネスを得ることができる。

【0033】請求項6の発明によれば、絶縁シートに配索治具としてのピンの挿通する孔を形成したので、絶縁シートの位置決めが簡単・確実にできるようになる。また、製品段階で、その孔をワイヤーハーネスの取り付け固定用にも利用することもできる。

【図面の簡単な説明】

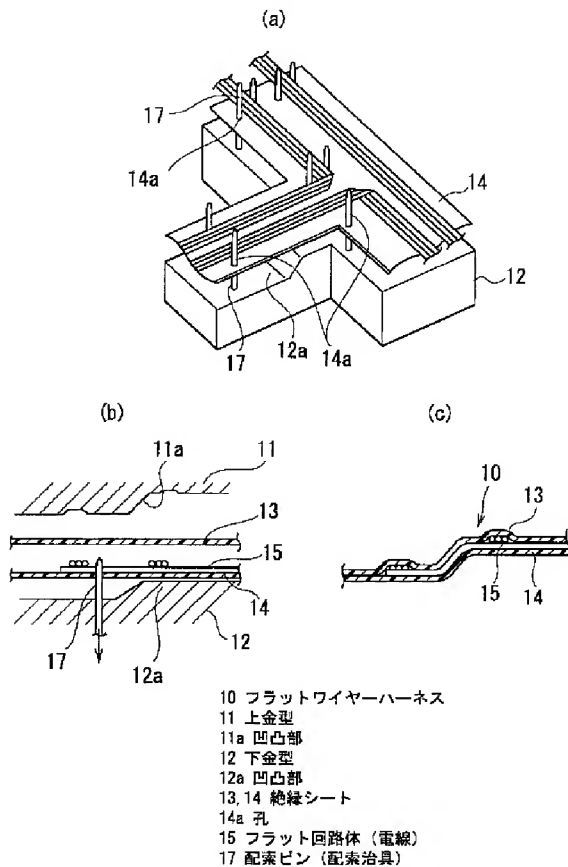
【図1】本発明の実施形態の説明図で、(a)は下金型の上に絶縁シートを介してフラット回路体を配索した状態を示す斜視図、(b)は上下金型を圧接しようとしている状態を示す断面図、(c)はプレス後の製品の断面図である。

【図2】従来の製造方法の説明図で、(a)はホットプレスする前の組み合わせ関係を示す斜視図、(b)はホットプレス後の製品を示す斜視図である。

【符号の説明】

- 10 フラットワイヤーハーネス
- 11 上金型
- 11a 凹凸部
- 12 下金型
- 12a 凹凸部
- 13, 14 絶縁シート
- 14a 孔
- 15 フラット回路体（電線）
- 17 配索ピン（配索治具）

【図1】



【図2】

